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WILLIAMS, MORGAN & AMERSON
10333 RICHMOND, SUITE 1100
HOUSTON, TX 77042

EXAMINER	
BLUM, DAVID S	

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/880,975
Filing Date: June 13, 2001
Appellant(s): SONDERMAN ET AL.

Jaison C. John
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/13/05 appealing from the Office action mailed 6/8/05.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The amendment after final rejection filed on 12/12/05 has been entered.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6428673	Ritzdorf et al	6-2002
6221765	Ueno	4-2001
6298470	Breiner et al	10-2001

6211094 Jun et al 4-2001

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 7-12, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,428,673 B1 (**Ritzdorf** et al.) in view of US 6,221,765 B1 (**Ueno**) and US 6,298,470 B1 (**Breiner** et al.).

Regarding claims 1 and 22, **Ritzdorf** discloses a method for controlling a thickness of an electroplated copper layer for **damascene** and **dual damascene** structures (col. 3, lines 10-21; col. 5, line 17) using feedback from metrology comprising,

forming a first copper layer;

measuring an actual thickness of the copper layer "**and/or other parameters**" (col. 9, lines 52-54);

comparing the actual thickness to a desired thickness; and

varying at least one parameter used to form the first copper layer in response to the actual thickness differing from the desired thickness **and the "other parameters."** (See Abstract; col. 3, line 64 to col. 4, line 15; col. 4, lines 37-65; col. 5, lines 2-5; col. 7, lines 36-45; col. 8, lines 49-53.)

Ritzdorf does not indicate that the mechanical stress relating to said first copper layer is measured and used for process control but, as noted, **Ritzdorf** suggests measurement of "other parameters" (called "metrology data") of the copper layer and the used of the measured other parameters to feedback or feed forward process control (*inter alia* at col. 9, lines 50-65).

Ueno teaches an electroplated damascene copper structure (e.g. in Fig. 1) wherein compressive stress is intentionally introduced into the copper layer during fabrication to prevent void generation (col. 3, lines 23-48).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to measure and use for process control (in the claim language "varying at least one parameter used to form the first copper layer in response to) the mechanical stress in order to ensure and to control the quantity of compressive stress in the copper layer to thereby prevent stress-induced voiding, as taught by **Ueno** -- especially since **Ritzdorf** suggests measuring other parameters of the copper layer and use the measured parameters for process feedback and feed forward control.

Both **Ritzdorf** and **Ueno** are drawn to electroplated damascene copper interconnect for semiconductor device fabrication and therefore, one of ordinary skill is ensured a reasonable expectation of success in combining the references.

Ritzdorf does not describe the damascene process disclosed therein.

Ueno teaches the basic copper damascene process known to one of ordinary skill also includes the formation of the dielectric with the opening, or in Applicant's claim language,

forming a first dielectric layer **2** above a first structure layer **1**;

forming a first opening **5** in the first dielectric layer **2** (called "trench patterning and "via patterning");

forming a first copper layer **6** above the first dielectric layer **2** and in the first opening **5**.

(See Ueno Figs. 1-5.)

It would have been obvious for one of ordinary skill in the art, at the time of the invention to form the damascene structure in **Ritzdorf**, according to steps indicated in **Ueno**, because **Ritzdorf** says a damascene structure is used and **Ueno** teaches and/or defines the notoriously well known steps for forming the damascene structure.

Then the only difference is that **Ritzdorf** does not teach the limitation that measuring the actual thickness of the copper layer comprises, "averaging a plurality of thicknesses from a plurality of locations" on said first copper layer.

Breiner teaches a method of process control during semiconductor fabrication by feedback from metrology tools (col. 3, lines 25-67) citing specific examples, wherein the data, including the thickness of deposited metal layers (col. 4, lines 20-25), is data that may be used to provide process control feedback. It is further stated therein that,

> "The wafer data may be collected and tracked on a per wafer basis, per

> lot basis, per process run basis or combinations thereof. Further, the data
> may include **multiple measurements for each data point, mean values, median values**, range of values, standard deviations, **wafer maps** of the collected data, etc." (col. 4, lines 60-65).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to "average a plurality of thicknesses from a plurality of locations" in determining the uniformity in **Ritzdorf**, in order to make the "wafer map" of thickness which shows the thickness globally and also provides a visual mapping of the uniformity, as taught in **Breiner**.

Regarding claim 7, it is seen to be inherent that the actual thickness is measured at a plurality of locations, because **Ritzdorf** indicates that the uniformity is determined thereby requiring the thickness determination at several points. (See MPEP 2112.)

Regarding claims 8 and 9, the prior art of **Ritzdorf**, as explained above, discloses each of the claimed features except for indicating that the measuring of the thickness at a plurality of locations includes determining the average or median of the actual measured thickness.

It would have been obvious for one of ordinary skill in the art, at the time of the invention to use the average or median (called "mean" in **Breiner**) of the plurality of points measured in **Ritzdorf** as taught in **Breiner** because the average or median values would provide a more precise measure of the thickness over the entire wafer than would a collection of un-analyzed or un-reduced thickness measurements.

Regarding claims 10-12, the prior art of **Ritzdorf**, as explained above, discloses each of the claimed features except for indicating that the measuring of the thickness at

a plurality of locations, inherently disclosed in **Ritzdorf**, includes comparing the desired thickness to each of the plurality of measured thicknesses (claim 10) or comparing the desired thickness to the average (claim 11) or median values (claim 12) of the thickness.

As noted above, **Breiner** teaches that the any of the above-highlighted data (each of the plurality of thicknesses, the average thickness, or the median thickness) provide feedback for process control. Feedback necessarily requires comparison of measured data to some desired value, otherwise there would exist no direction in which to modify the process to move in the direction of the desired value, and consequently no control could be provided. Moreover, **Breiner** provides examples of process control based upon feedback of measured thickness (col. 6, lines 15-32 and col. 7, lines 15-38).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to compare the measured data (each of the plurality of thicknesses, the average thickness, or the median thickness) as taught by **Breiner** in the method of **Ritzdorf**, because **Ritzdorf** indicates that thickness and uniformity are data used to modify the process of depositing copper and because **Breiner** teaches that any of the measured data (each of the plurality of thicknesses, the average thickness, or the median thickness) may be used to provide feedback (i.e. comparison to a desired value) for process control.

3. Claims 1, 7, 8, 10, 11, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,428,673 B1 (**Ritzdorf** et al.) in view of US 6,221,765 B1 (**Ueno**)

and US 6,211,094 B1 (**Jun** et al.; reference provided by Applicant in the IDS filed 27 August 2003 [Paper no. 16]).

Regarding claims 1 and 22, **Ritzdorf** discloses a method for controlling a thickness of an electroplated copper layer including damascene layers (col. 3, lines 10-21) using feedback from metrology comprising,

forming a first copper layer;

measuring an actual thickness of the copper layer;

comparing the actual thickness to a desired thickness; and

varying at least one parameter used to form the first copper layer in response to the actual thickness differing from the desired thickness. (See Abstract; col. 3, line 64 to col. 4, line 15; col. 4, lines 37-65; col. 5, lines 2-5; col. 7, lines 36-45; col. 8, lines 49-53.)

Ritzdorf does not indicate that the mechanical stress relating to said first copper layer is measured and used for process control but, as noted, **Ritzdorf** suggests measurement of "other parameters" (called "metrology data") of the copper layer and the used of the measured other parameters to feedback or feed forward process control (*inter alia* at col. 9, lines 50-65).

Ueno teaches an electroplated damascene copper structure (e.g. in Fig. 1) wherein compressive stress is intentionally introduced into the copper layer during fabrication to prevent void generation (col. 3, lines 23-48).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to measure and use for process control (in the claim language "varying at least one parameter used to form the first copper layer in response to) the mechanical

stress in order to ensure and to control the quantity of compressive stress in the copper layer to thereby prevent stress-induced voiding, as taught by **Ueno** -- especially since **Ritzdorf** suggests measuring other parameters of the copper layer and use the measured parameters for process feedback and feed forward control.

Both **Ritzdorf** and **Ueno** are drawn to electroplated damascene copper interconnect for semiconductor device fabrication and therefore, one of ordinary skill is ensured a reasonable expectation of success in combining the references.

Ritzdorf does not describe the damascene process disclosed therein.

Ueno teaches the basic copper damascene process known to one of ordinary skill also includes the formation of the dielectric with the opening, or in Applicant's claim language,

forming a first dielectric layer **2** above a first structure layer **1**;

forming a first opening **5** in the first dielectric layer **2** (called "trench patterning and "via patterning");

forming a first copper layer **6** above the first dielectric layer **2** and in the first opening **5**.

(See Ueno Figs. 1-5.)

It would have been obvious for one of ordinary skill in the art, at the time of the invention to form the damascene structure in **Ritzdorf**, according to steps indicated in **Ueno**, because **Ritzdorf** says a damascene structure is used and **Ueno** teaches and/or defines the notoriously well known steps for forming the damascene structure.

Then the only difference is that **Ritzdorf** does not teach the limitation that measuring the actual thickness of the copper layer comprises, "averaging a plurality of thicknesses from a plurality of locations" on said first copper layer.

Jun teaches a method of process control during semiconductor fabrication by feedback from metrology tools (Abstract; Figs. 4A-4B), specifically including "averaging a plurality of thicknesses from a plurality of locations" to determine the actual thickness of the deposited layer --as further limited by instant claim 8-- and using this data to provide process control feedback to adjust the deposition process parameters (col. 4, lines 20-67 -- especially "TABLE 1").

It would have been obvious for one of ordinary skill in the art, at the time of the invention to "average a plurality of thicknesses from a plurality of locations" to provide process feedback data in **Ritzdorf**, in order to better control the deposition process, as taught in **Jun**.

Regarding claim 7, it is seen to be inherent that the actual thickness is measured at a plurality of locations, because **Ritzdorf** indicates that the uniformity is determined thereby requiring the thickness determination at several points. (See MPEP 2112.)

Regarding claims 10 and 11, comparing the actual thickness to the desired thickness comprises comparing the desired thickness to each of the plurality of measure thicknesses (**Jun** Table 1 --especially the footnote to Table 1) and also comparing the desired thickness to the average thickness (col. 4, last paragraph).

It would have been obvious for one of ordinary skill in the art, at the time of the invention to "average a plurality of thicknesses from a plurality of locations" to provide

process feedback data in **Ritzdorf**, in order to better control the deposition process, as taught in **Jun**.

(10) Response to Argument

The appellant argues that the removal of information regarding metrology instruments from the specification does not constitute new matter. The examiner's objection is recited below for clarity to the Appeal Board.

Specification

The amendment filed 23 August 2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The Amendment to the specification removes admissions of prior art and accordingly introduces new matter. These portions must not be removed.

Applicant is required to cancel the new matter in the reply to this Office Action.

The examiner notes that some but not all of the material removed from the specification has been placed back into the specification with the amendment of 12/12/05. The examiner also notes that this is a petitionable matter, and not an appealable issue.

The appellant argues that Ritzdorf discloses a metrology system for forward feed or back feed of uniformity and thickness data for electroplating, but fails to teach forming an opening upon a first dielectric layer formed above a structure upon which the copper layer is formed and controlling a parameter based upon a measured thickness. This is a basic Damascene process, and is taught by Ueno and Ritzdorf teaches the method may be used for damascene and dual-damascene processes. Even though Ritzdorf may not show the opening in a dielectric layer, the teaching that the process is useful toward a damascene or dual damascene process suggests this. It is the combination of Ritzdorf and Ueno that combined teach the damascene process, and (as taught by Ritzdorf) one would use a parameter based upon thickness to control the deposition process. The appellant is merely attacking the references individually rather that the combination, as utilized by the examiner.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The appellant also argues that Ritzdorf does not teach averaging the thickness of a plurality of sites on a copper layer. The examiner notes that Breiner teaches this and is

part of the 103 rejection. The appellant is merely attacking the references individually (as above) rather that the combination, as utilized by the examiner.

The appellant argues that Ueno does not show why knowing the specific quantity of stress in copper is important, but merely points out that residual stress may be present and makes a guess that stress may be the result of shrinking of the plating process. However, Ueno teaches that the stress is present, therefore, it must have been measured to detect its presence. Further, there is no limitation in the claims that require a full understanding of why the specific quantity of stress is important.

The appellant also argues that Breiner is directed toward extrapolating data to improve yields, and makes a passing reference to a "mean" value of data but does not disclose or make obvious varying at least one parameter used to form the first copper layer in response to the actual thickness differing from the actual thickness from the desired thickness and mechanical stress. The appellant also argues that Breiner does not refer to averaging a plurality of thickness from a plurality of locations on a copper layer. The appellant is merely attacking the references individually (as above) rather that the combination, as utilized by the examiner. Also, it is important to note that the claims do not require varying any measurements in response to stress, but rather thickness (one would compare thickness to a desired thickness, not a desired stress, and the claim limitations recite, "varying at least one parameter used to form the copper layer in response to the actual thickness differing from the actual thickness and said mechanical

stress"). Also, as Ritzdorf teaches comparing thickness to a desired thickness to control the deposition process, and in combination with Breiner (teaching the advantages of a plurality of measurements and obtaining a mean value, this limitation becomes obvious.

The appellant argues that Jun merely discloses measurement of wafers that are analyzed at various zones, but does not disclose averaging the plurality of thickness. The examiner notes figure 4A shows this.

Regarding claims 1, 7-12, and 22, the appellant argues that Ritzdorf does not disclose averaging the thickness from a plurality of sites on a copper layer. As above, the examiner never made such an assertion. The appellant is merely attacking the references individually rather that the combination, as utilized by the examiner. It is the combination of references that teach the limitations of the above claims.

The appellant also argues that Ueno does not show why knowing the specific quantity of stress in copper is important, but merely points out that residual stress may be present and makes a guess that stress may be the result of shrinking of the plating process. However, Ueno teaches that the stress is present, therefore, it must have been measured to detect its presence. Further, there is no limitation in the claims that require a full understanding of why the specific quantity of stress is important. The claim limitations recite, "varying at least one parameter used to form the copper layer in

response **to the actual thickness differing from the actual thickness** and said mechanical stress"

The appellant also argues that Breiner does not refer to averaging a plurality of thicknesses from a plurality of locations on a copper layer. However, Breiner teaches making multiple measurements (including thickness) and averaging (mean values) for process control feedback on metal deposition. One skilled in the art would understand that as copper is a metal, the teachings of Breiner would apply to a copper layer. (column 3 lines 25-67, column 4 lines 20-25, and 60-65).

The appellant also argues that Ritzdorf does not teach forming an opening upon a first dielectric layer formed above a structure upon which the copper layer is formed and controlling a parameter based upon a measured thickness. This is a basic Damascene process, and is taught by Ueno. It is the combination of Ritzdorf and Ueno that combined teach the damascene process, and (as taught by Ritzdorf) one would use a parameter based upon thickness to control the deposition process. The appellant is merely attacking the references individually (as above) rather that the combination, as utilized by the examiner.

The appellant also argues that Ritzdorf does not teach averaging the thickness of a plurality of sites on a copper layer. The examiner notes that Breiner teaches this and is

part of the 103 rejection. The appellant is merely attacking the references individually (as above) rather that the combination, as utilized by the examiner.

The appellants argue that they are not interested in attacking references individually, however, this appears to be exactly what the appellants are doing. The appellants are arguing that a given reference does not contain limitations for which the examiner never made statements that the reference taught these limitations, and then ignores that the limitations are in a secondary reference. The appellant also argues that the appellant is merely pointing out that these references have individual defects of subject matter, that when combined, all of the elements of the claimed invention would not be obvious. The appellants are arguing that a given reference does not contain limitations for which the examiner never made statements that the reference taught the limitation, and then ignores that the limitation is in a secondary reference. The appellants fail to argue that the combination of cited references do not teach all of the limitations of the claimed invention or why a combination would not make all of the limitations of the claimed invention obvious.

The appellant also argues that Ueno does not modify a parameter by measuring stress. It is important to note that the claims as written, do not require this. The claims limit the invention to varying one parameter in response to the actual thickness differing from the desired thickness and mechanical stress. As the claims are measuring the actual thickness, it is compared with a desired thickness, not a stress. The claim limitations

recite, "varying at least one parameter used to form the copper layer **in response to the actual thickness differing from the actual thickness** and said mechanical stress".

The appellant again argues that Ueno does not show why knowing a specific stress is important. This argument was answered above. Also, as the claims are measuring the actual thickness, it is compared with a desired thickness, not a stress. Although the claims recite measuring a mechanical stress (Ueno acknowledges a stress is present), the stress need not be the parameter varied to maintain the process, as the claims recite, the claim limitations recite, "varying at least one parameter used to form the copper layer **in response to the actual thickness differing from the actual thickness** and said mechanical stress".

The appellant also argues that even if Ritzdorf and Ueno were combined with Breiner, this element (stress) of the present invention would not be obvious. However, Ueno acknowledge the presence of stress, and one could measure, average and compare thickness of the sample and practice the instant invention. Stress need not be the parameter varied to maintain the process, as the claims recite, the claim limitations recite, "varying at least one parameter used to form the copper layer **in response to the actual thickness differing from the actual thickness** and said mechanical stress".

The appellant argues that the examiner erred in asserting that the appellant arguments regarding Breiner are based upon a false premise. Specifically, the appellants point to column 4 lines 62-63, arguing that Breiner discloses multiple measurements for each data point, and not refer to averaging a plurality of thicknesses from a plurality of locations. The examiner disagrees. The cited section also refers to wafer maps of the collected data. Although it is possible one would map one location on a wafer, it seems unlikely as if only one location was used to obtain data, there would be no reason to map it. The examiner asserts that mapping the collected data suggests data is collected from a plurality of locations and the map is to later reference where each data point was collected.

The appellant also argues that the term "mean value" was used to suggest multiple measurements for each data point and not for different data points. However, in light of the wafer map, there is a clear suggestion of multiple data locations.

The appellant argues that the term "wafer map" refers to a reference to electrical testing and the examiner does not offer any evidence to the contrary. Although Breiner mentions wafer maps with electrical testing column 4 lines 16-17, data not limited to, and lines 48-53), Breiner also mentions wafer maps with wafer probe data (column 4 lines 54-57), and data collected from the process tool may even be more extensive (column 4 lines 66-67), including but not limited to "data relating to conditions the semiconductor substrate is process under..." and data relating to equipment

maintenance and quality...". Although thickness is not specifically mentioned in the examples, one of ordinary skill in the art would understand that thickness is a measurement for maintaining equipment designed to form a layer of set thickness, and the mathematical model of Breiner is applicable. Further, Breiner teaches characteristics for which measurements are taken include thicknesses of grown or deposited layers (column 4 lines 20-25) further suggesting that thickness is a quality control measurement.

The appellant then argues that Ritzdorf in combination with Ueno and Breiner do not disclose or make obvious all of the elements of claim 1. However, as described above, the combination does disclose and make obvious all of the elements of claim 1.

The appellant further argues that Ritzdorf does not disclose averaging the thickness from a plurality of sites on a copper layer, controlling a parameter in response to the thickness data that is averaged from a plurality of positions and that these limitations are not made up for by Ueno and/or Breiner. The examiner disagrees. As described above, the combination teaches all of the limitations of the claims. Ritzdorf teaches using measured thickness for controlling the thickness of a copper layer in a damascene process, Ueno teaches a damascene process and that such a process includes an opening in a dielectric layer, and Breiner teaches mathematical modeling for using obtained date to control the deposition of a metal layer. In doing so, the references disclose all of the positive steps of the claims.

The appellant then argues (individually) what each reference teaches, without arguing the references in the context of the combination as used by the examiner. The appellant argues that Ritzdorf does not teach an opening upon a first layer formed above a structure upon which a copper layer is formed and controlling the parameter based upon a measured thickness. However, Ritzdorf teaches all of this except for the structure formation, but does teach the process is for a damascene or dual damascene structure and as taught by Ueno, a damascene structure includes an opening upon a first layer formed above a structure upon which a copper layer is formed. Therefore, in light of Ueno, the limitation of "an opening upon a first layer formed above a structure upon which a copper layer is formed" is taught by Ritzdorf.

The appellant also argues that Ritzdorf does not disclose averaging the thickness from a plurality of sites on a copper layer. This limitation is taught by Breiner.

The appellant also argues that neither Ritzdorf, Ueno or Breiner disclose measuring a stress and varying a parameter to form the first copper layer in response to the actual thickness differing from the desired thickness and stress. However, Ueno measures a stress (identifies its presence, therefore it is measured) and as written, the claims do not require varying a parameter based upon measuring the stress and comparing it to a desired stress, but rather measuring the actual thickness, comparing the actual thickness to the desired thickness, measuring stress, and "varying at least one

parameter used to form the copper layer **in response to the actual thickness differing from the actual thickness** and said mechanical stress". In order to practice the invention as claimed, one need not use stress as the parameter to be varied.

The appellant further argues that Ueno does not measure the stress to modify a parameter to form a copper layer. As recited above, this is not claimed. Although one could measure the stress to modify a parameter to control the process, it is not required. Measuring thickness, comparing the measured thickness with the desired thickness, and modifying any parameter (Ritzdorf modifies the process in response to measured thickness, therefore a parameter is modified) reads on the instant claims.

The appellant again argues the use of wafer map to suggest multiple data locations and in particular regarding thickness. Although Breiner mentions wafer maps with electrical testing column 4 lines 16-17, data not limited to, and lines 48-53), Breiner also mentions wafer maps with wafer probe data (column 4 lines 54-57), and data collected from the process tool may even be more extensive (column 4 lines 66-67), including but not limited to "data relating to conditions the semiconductor substrate is process under..." and data relating to equipment maintenance and quality...". Although thickness is not specifically mentioned in the examples, one of ordinary skill in the art would understand that thickness is a measurement for maintaining equipment designed to form a layer of set thickness, and the mathematical model of Breiner is applicable. Further, Breiner teaches characteristics for which measurements are taken include thicknesses of grown

or deposited layers (column 4 lines 20-25) further suggesting that thickness is a quality control measurement.

The appellant argues that Breiner makes only a passing reference to a "mean" value of data points, and does not disclose measuring the thickness of a copper layer. The examiner is unclear what constitutes a "passing reference". Breiner teaches a mean value is used in comparing data and that suggests an average. As to thickness of a copper layer, Breiner teaches measuring the thickness of a grown or deposited layer of metal on a semiconductor (column 4 lines 20-25), and one skilled in the art would understand that includes copper.

Regarding arguments **"B"**, the appellant argues that Ritzdorf does not teach all of the elements of the claims and Ueno and Jun do not make up the deficit. In particular, the appellant argues that Jun does not teach disclosing averaging the plurality of thicknesses from a plurality of locations on the copper layer. However Jun specifically teaches this (see abstract, and figures 4A-4B). the appellant argues that Jun does not teach comparing the actual thickness to a desired thickness. However, Jun teaches using this data as feedback to control the process which means the actual thickness data is compared to a norm or desired thickness. The applicant further argues that Jun does not teach measuring the stress (Ueno does this.)

The appellant argues that independent claims 1 and 22 are allowable for the reasons cited above. As argued by the examiner, the independent claims are not allowable.

The appellant argues that dependent claims 7-9 and 10-12 are allowable as they depend from dependent claim 1. As argued by the examiner, the independent claims are not allowable.

The appellant argues that claims 1, 7-12, and 22 are allowable for the reasons cited above. As argued by the examiner, the independent claims are not allowable.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

David S. Blum

Conferees:

Carl Whitehead Jr.

Ricky Mack